

REMARKS

In the Office Action, the Examiner rejected claims 1-3, 6-10, and 17-19 pursuant to 35 U.S.C. § 102(e) or 103 (a) as unpatentable over Daft, et al. (U.S. Patent No. 7,087,023). Claims 1-3, and 6-10 were rejected pursuant to 35 U.S.C. § 103(a) as being unpatentable over Ladabaum (U.S. Patent No. 6,562,650) in view of Daft, et al. Claim 4 was rejected pursuant to 35 U.S.C. § 103(a) as unpatentable over Daft, et al. or Ladabaum in view of Daft, et al., and in further view of Baumgartner, et al. (U.S. Patent No. 6,831,394). Claims 5, 11, and 13-19 were rejected pursuant to U.S.C. § 103(a) as unpatentable over Daft, et al. or Ladabaum in view of Daft, et al., and further in view of Dreschel, et al. (U.S. Patent No. 6,773,401). Claim 16 was rejected pursuant to 35 U.S.C. § 103(a) as unpatentable over the references used to reject claim 11 and further in view of Sumanaweera, et al. (U.S. Patent No. 6,359,367). Claim 20 was rejected pursuant to 35 U.S.C. § 103(a) as unpatentable over the references used to reject claim 17 and in further view of Baumgartner, et al. Claims 21-31 were rejected pursuant to 35 U.S.C. § 103(a) as unpatentable over the references used to reject claim 3 alone or in further view of Sumanaweera, et al. Applicants respectfully request reconsideration of the rejections, including the rejections of independent claims 1, 8, 11, 17, 21, and 28.

Independent claim 1 has been amended to include the limitations of claims 3 and 4. In particular, claim 1 recites electrical interconnections within the substrate between electrodes associated with membranes, and interconnecting other electrodes into elements with signal traces of a flexible circuit adjacent to the membranes.

A person of ordinary skill in the art would not have used the flex circuit teaching of Baumgartner, et al. with Daft, et al. or with Ladabaum. Baumgartner, et al. laminate a flexible circuit to the MUT by applying pressure (col. 2, lines 50-56; and col. 5, lines 15-34). The flex circuit is laminated on a backside (col. 5, lines 15-34) or on a top side adjacent to the cMUT (Fig. 2). The flex circuit provides for connection from each element to electronics.

Ladabaum desires the circuits to be on a same chip (col. 2, lines 40-54). A person of ordinary skill in the art would not have subjected the manufacture to risks of pressure by applying flex circuit for element signal routing where Ladabaum avoids the problem by including the electronics in the substrate.

Daft, et al. avoids individual cell connection by using a matrix approach (see Figs. 2, 4 and 5). A person of ordinary skill in the art would not have used the cell connecting flex approach of Baumgartner, et al. since side connects may be used in the matrix of Daft, et al.

Independent claim 8 is allowable for the same reasons as claim 1.

Independent claim 11 was amended with the limitations of claim 12 and recites pads on the edge. The Examiner did not indicate a rejection of claim 12. Dreshel, et al. shows wrap-around electrodes, but not pads on the edge. Pads 6 and 10 of Dreshel, et al. are on a top surface near an edge (see Figs. 2D and 3), not on the edge surface.

Independent claim 17 and dependent claim 5 are allowable for the same reasons as claim 11.

Claim 21 recites a polymer layer over membranes and a conductive trace in the polymer layer. The Examiner cites to Daft, et al. or Sumanaweera, et al. for these limitations.

Daft, et al. deposit an insulation layer 360 over the uppermost electrodes 241B and interconnects 251 (col. 6, lines 3-5; and Fig. 3). There are no conductive traces in the insulation layer 360.

Sumanaweera, et al. generally discloses multilayer interconnects for integrated circuits (col. 2, line 50-col. 3, lines 10). Sufficient interconnects are used to allow interconnect routing within the areal outline of the spiral array (col. 3, lines 43-49). The membranes of the spiral array are sparse (col. 5, lines 21-30; and Fig. 1). The interconnects are routed under or around the acoustic elements (col. 6, lines 25-31; and col. 6, line 45-col. 7, line 5). Elements may be acoustically isolated by polymer filled trenches in the surface of the substrate (col. 7, lines 48-51). Sumanaweera, et al. disclose a variety of interconnect techniques and suggest using ones that route signals around or under elements. Sumanaweera, et al. do not suggest a polymer layer over membranes and do not suggest conductive traces in such a layer.

Independent claim 28 and dependent claim 16 are allowable for the same reasons as claim 21.


Additional dependent claims patentability distinguish from the cited references. Claim 22 recites an additional polymer layer over the membranes and with an additional conductor. The cited references do not show one such layer with traces, so do not suggest two layers. Claim 23 recites the polymer layer covering and being between the conductors. The references do not show this positioning. Claim 24 recites positioning also not shown by the references. Claim 25 recites the trace in the polymer layer connecting with an edge conductor. Dreshel, et al. show wrap around conductors, but not connection to a trace in a polymer layer over membranes. Claim 31 is allowable for the same reasons as claim 22.

CONCLUSION:

Applicants respectfully submit that all of the pending claims are in condition for allowance and seeks early allowance thereof. If for any reason, the Examiner is unable to allow the application but believes that an interview would be helpful to resolve any issues, he is respectfully requested to call the undersigned at (650) 694-5810 or Craig Summerfield at (312) 321-4726.

PLEASE MAIL CORRESPONDENCE TO: Respectfully submitted,

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